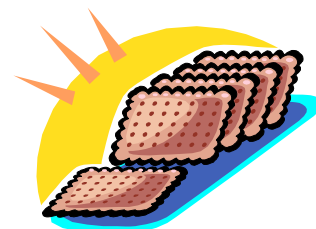


Dynamic Design: A Collection Process

It's a Hit!

STUDENT ACTIVITY

When you read the "Micrometeoroids and More" text, you found out that scientists had to simulate the conditions of micrometeoroid impact with the silicon wafers. We will use a different kind of wafer to simulate this process. Your group will test how well a cracker can withstand the impact of three sizes of projectiles.



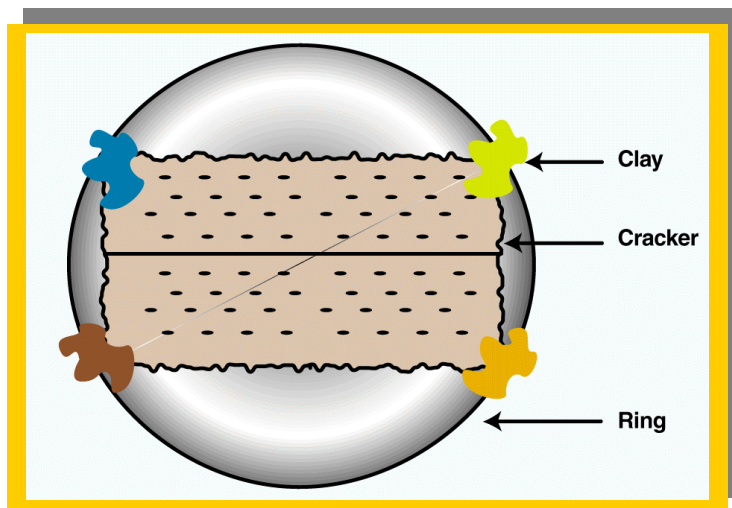
PROBLEM AND HYPOTHESIS:

PROCEDURE:

1. Obtain a ring stand, crackers, clay, and projectiles (perhaps different sized candies).
2. Divide the tasks among the group members.

Task 1 (two people)

Using the ring, crackers, and clay, mount the crackers in the center of the ring so that they are suspended in the middle. Take notes on how this is done, so that it can be repeated with each size projectile. (See the diagram below for an example.)



Task 2 (one person)

Measure the diameter of each of the projectiles. This can be done by stacking several projectiles, measuring the length and finding the mean (average). The projectiles that were used at Johnson Space Center's (JSC's) Impact Laboratory were 164 microns, 238 microns, and 344 microns. Form a ratio to compare the diameters of your projectile with those used in the JSC lab using ratios. The units should be the same for this comparison.



Task 3 (one person)

Decide the distance from which your team will drop the projectile. Measure this distance and drop the projectiles. Using a stopwatch (or the formula $d = \frac{1}{2} at^2$, d = distance, $a = 9.8 \text{ m/s}^2$, t = time), determine the time it took for the projectile to go from the person's hand to the cracker. Determine the average speed of the projectiles (distance divided by time)(meters per second). The speed used at JSC's Impact Laboratory was 7 km/s. Compare the speed of your projectile with the speed used in the lab by using ratios. Make sure the units are the same for this comparison.

3. Once everyone has completed their tasks, drop the projectile from the distance that your group chose using the smallest projectile. Draw the cracker and make qualitative and quantitative observations below. Repeat this process with the other two projectiles using a new cracker each time.

RESULTS

Drawings:

Projectile Size 1 _____

Projectile Size 2 _____

Projectile Size 3 _____



Additional Observations:

Conclusions: